

➤ ATV - Automated Transfer Vehicle

While not attached permanently to the ISS, Automated Transfer Vehicles (ATV) are nonetheless a vital element of the station. The fully automatic 20-tonne freighters ferry up to 9 tonnes of supplies to the ISS and also serves as a space tug, using its own propulsion system to correct the station's altitude and orbit. ATV modules are launched onboard an Ariane 5 rocket.



The system has two main elements:

- A propulsion and piloting module enabling the vehicle to reach the Space Station automatically once detached into orbit from the launcher;
- An integrated cargo carrier (ICC) enabling supplies and materials to be transported between Earth and the Space Station, up to a maximum useful load of 7,300 kg.

The first ATV called “Jules Vernes” was launched in September 2008. After completing its supply mission – up to 860 kg of propellant, 840 kg of water, 100 kg of air and 5,500 kg of dry cargo – the ATV Jules Vernes carried away the Station's waste. The ATV was eliminated by destructive re-entry into the atmosphere.

The second ATV called “Johannes Kepler” will be launched early 2011.

Thales Alenia Space is in charge of the design and construction of the “cargo carrier” for the prime contractor Astrium Space Transportation, and also the integration and testing of the complete ATV-ICC.

➤ Columbus

Columbus laboratory was launched in February 2008 and is permanently attached to Node 2. Developed for ESA, this multifunction pressurized module is Europe's first space laboratory allowing long-term research in a microgravity environment, fluid physics and biosciences, as well as space sciences and Earth observation. It is designed for 10 years of operation.

Columbus is a cylindrical module measuring over 6.5 m in length and 4.5 m in diameter with a total mass of 12,400 kg. Its internal volume is 75m³, with room for up to three people.

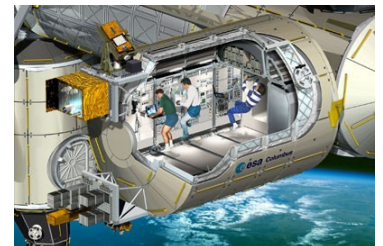
Columbus comprises 5 internal payloads:

- the “Fluide Science Laboratory” (FSL) supporting scientific microgravity research in fluid physics;
- the “European Drawer Rack” (EDR), a multi-user facility housed within the Columbus laboratory, supporting and providing services to small and modular payloads.
- the “Biolab”, a facility designed to support biological experiments on micro-organisms, cells, tissue cultures, small plants and small invertebrates.
- the “European Physiology Module” (EPM)
- the “European Transport Container” (ETC).

It contains as well an external payload named “SOLAR” enabling to measure solar radiations.

Thales Alenia Space has developed 2 of these internal payloads: the FSL and the EDR as well as SOLAR.

Commissioned by ESA, Columbus is built by a consortium of European companies led by Astrium Space Transportation, in which Thales Alenia Space is playing a key role, participating in the definition of the system and supporting the final integration and testing phase, undertaking responsibility for the definition, development and pre-integration of the entire thermo-mechanical part of the system.



Thales Alenia Space : the reference in civil and defense programs

European leader for satellite systems and at the forefront of orbital infrastructures, Thales Alenia Space is a joint venture between Thales (67%) and Finmeccanica (33%) and forms with Telespazio a Space Alliance.

Thales Alenia Space is at the heart of the most high-performance satellite technologies in both civil and defense sectors. Thales Alenia Space is a worldwide reference in telecoms, navigation, defense and security, science and exploration, radar and optical Earth observation specifically in meteorology, oceanography, and climatology.

The company achieved revenues of Euro 2 billion in 2009 and has a total of 7,200 employees located in 9 industrial sites in France, Italy, Spain and Belgium.